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10/691,041	10/22/2003	Michael A. Klug	ZEB0042US	7543

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EXAMINER	
JUBA JR, JOHN	
ART UNIT	**PAPER NUMBER**
2872	

DATE MAILED: 07/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/691,041	KLUG ET AL.	
	Examin r	Art Unit	
	John Juba, Jr.	2872	

-- The MAILING DATE of this communication appears on the cover she t with the corr spond nce address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,7 and 10-26* is/are rejected.

7)☒ Claim(s) *6, 8, and 9* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *1/26/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

The formal drawings were received on January 30, 2004. These drawings are acceptable to the examiner.

Claim Objections

Claims 5 and 11 are objected to because of the following informalities. Appropriate correction is required:

Claim 5 is objected to for reciting that the recording material "further comprises" one of several possibilities. Rather than reciting additional structure, it is believed that claim 5 purports to further limit structure already recited. Thus, in line 1, it is believed that "wherein" should read "further wherein", while "further" (line 2) should be deleted.

In claim 11, "the spatial light modulator" lacks antecedent basis.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 – 5, 7, 13 – 20, 22, and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by French (U.S. Patent number 5,796,498). Referring *for example* to

Figure 1 and the associated text, French discloses an apparatus for recording and displaying holographic images comprising:

a pulsed laser light source (1) that produces a coherent beam;

a beam splitter (2) that splits the coherent beam into an object beam(3) and a reference beam (4);

an object beam optical system (5) for directing the object beam to interfere with the reference beam at an updateable holographic recording material (8);

a reference beam optical system (6) for directing the reference beam to interfere with the object beam at the updateable holographic recording material;

an illumination source (15) oriented with respect to the updateable holographic recording material so as to illuminate at least one hogel recorded in the updateable holographic recording material for viewing by an observation system (9). French discloses a *non-illustrated* embodiment wherein the observation system is not a camera, but rather the eye of a user (Col. 2, lines 45 - 51).

Although not illustrated, a material holder holding the updateable holographic recording material is *inherent* in the apparatus of Figure 1, since levitation of the recording material in mid-air would be contrary to recognized laws of physics. Further, French discloses a scanned embodiment (Fig. 2) wherein the updateable holographic recording material (8) is supported by a carriage (II). The preambular recitation that the apparatus is for use in recording "stereograms" is not seen as positively limiting the structure of the element recited. The body of the claim intrinsically sets forth all of the

structural limitations, and the preamble merely states the purpose or intended use of the invention, rather than any distinct definition of the claimed structure. *Pitney Bowes, Inc. v. Hewlett-Packard Co.,* 182 F3.d 1298, 51 USPQ2d 1161 (Fed. Cir. 1999); *Rowe v. Dror*, 112 F3.d 473, 42 USPQ2d 1550 (Fed. Cir. 1997).

With regard to claims 2 and 3, French expressly discloses the updateable holographic recording material as operable to store a succession of image frames (Col. 2, lines 36 – 44; Col. 3, lines 33 – 40). The image is clearly disclosed as being "temporarily" stored. The operation of incident recording illumination to erase (substantially) any image previously recorded is *inherent* when the image is stored in photorefractive crystals, such as used by French. Thus, in the apparatus of French, it is the said-same "light source that produces a coherent beam" that erases the hogel (or "frame").

With regard to claim 4, those of ordinary skill will appreciate that the space charge distribution that gives rise to the refractive variations within the photorefractive crystal (and thus to the stored "image") is ephemeral. Lacking a deliberate step of "fixing" the distribution (such as by heating), the hogel region is *inherently* "operable" to substantially erase the hogel region using a natural decay property of the crystal. Insofar as French expressly discloses the frames as being "temporarily" stored, it is clear that the regions are subject to natural decay after the last writing operation. Thus, the hogel region is erased prior to the next use of the apparatus.

With regard to claim 7, the crystal may be arbitrarily divided into regions or "hogels". Thus, first and second hogels are simultaneously exposed, subsequently read out, and successively re-exposed.

With regard to claim 13, the reference beam optical system of Figure 2 further comprises mirror (or beam splitter 16) which is fairly disclosed as moving with the updateable holographic recording material (8) (Col. 3, lines 35 – 40). Thus, carriage (II) fairly constitutes a reference beam optical system translation system.

With regard to claims 15, *et seq.,* operation of the apparatus of French with the frame grabber to average a succession of images as described in Col. 2 (lines 27 – 44) inherently carries out the recited method steps. The crystal can be arbitrarily divided into a plurality of contiguous portions. In the disclosure of French, the step of exposing a plurality of portions (to exposed the entire crystal) anticipates the recited step of exposing a "first" portion. The hogel recorded in that portion is then read-out to the observation system, and the process is repeated for a second portion. Further, it is clear from Applicants' claim construction (*vis á vis* claim 16) that the first and second "portions" can be the same portion.

With regard to claims 16 and 17, the method includes the step of at least partially erasing the hogel, as set forth above for claims 2 and 3.

With regard to claim 19, the crystal may be arbitrarily divided into regions or portions, some of which are separate from each other. Thus, first and second portions, geometrically separated from each other are simultaneously exposed, subsequently read out, and successively re-exposed.

With regard to claim 20, the step of exposing the crystal inherently includes the step of orienting the reference and object beams at respective angles with respect to the crystal. Each of these respective angles is a subset of the collection of "arbitrary" angles. Thus, each is an "arbitrary' angle.

With regard to claim 22, operation of the apparatus of French as described above with respect to claim13, inherently includes the step of translating a reference beam optical system with respect to the hologram recording material.

Claims 15 and 20 – 26 are rejected under 35 U.S.C. 102(b) as being anticipated by GEOLA TECHNOLOGIES (WO 01/45943 A2). Referring *for example* to Figure 2 and the associated text (beginning on Pg. 32), GEOLA TECHNOLOGIES anticipate a method of recording and "displaying" holograms comprising the steps of

providing an "updateable" holographic recording material (as discussed below);

exposing a first portion to a first interference pattern formed by a reference beam and an object beam from a pulsed laser, thus forming a hogel in the first portion;

exposing a second portion of the updateable holographic material to a second interference pattern formed by the reference beam and the object beam from the pulsed laser to thus form a hogel with an updated perspective view of an object.

These method steps are carried out to form an "H1" as part of a method of forming a white-light viewable "H2". Thus, as shown in Figure 4, each of the hogels from the first and second portions is illuminated. Thus, the method of GEOLA TECHNOGIES inherently includes the steps of illuminating the hogel and illuminating the updated hogel. The claims do not require the steps to be performed in the order recited. As to the recitation of the recording material as being updateable, GEOLA TECHNOLOGIES do not disclose a particular recording material, other than a "holographic film" subject to later chemical processing (Pg. 40). Still, it is clear that prior to the chemical processing, regions are successively updated to effect ensemble averaging of the successive exposures. Thus, the hogels are "updateable" within the specificity recited.

With regard to claim 20, the method includes orienting the reference beam at several of a plurality of angles. Each of these respective angles is a subset of the collection of "arbitrary" angles. Thus, each is an "arbitrary' angle.

With regard to claims 21 and 22, GEOLA TECHNOLOGIES disclose translating a reference beam optical system (249 or 256) and translating an object beam optical system (212 and 219).

With regard to claim 25, GEOLA TECHNOLOGIES clearly teach advancing a flexible film (262) with rollers (224) and (225).

With regard to claims 23 and 24, GEOLA TECHNOLOGIES disclose use of a spatial light modulator (212) under direction of a computer to present a rendered image which has been compensated for any of various forms of distortion.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1 – 3 and 10 – 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horikoshi, et al (U.S. Patent number 6,281,994), in view of French (U.S. Patent number 5,796,498). Referring *for example* to Figure 12 and the associated text, Horikoshi, et al disclose an apparatus for recording and displaying holographic images comprising:

a light source (1201) that produces a coherent beam;

a beam splitter (1205) that splits the coherent beam into an object beam and a reference beam (1226);

an object beam optical system (1401) for directing the object beam to interfere with the reference beam at an updateable holographic recording material (1208); and

a reference beam optical system (1207) for directing the reference beam to interfere with the object beam at the updateable holographic recording material.

Upon illumination, at least one hogel recorded in the updateable holographic recording material is played back for viewing by a user. Although not illustrated, a material holder holding the updateable holographic recording material is *inherent* in the apparatus of

Figure 1, since levitation of the recording material in mid-air would be contrary to recognized laws of physics. The preambular recitation that the apparatus is for use in recording "stereograms" is not seen as positively limiting the structure of the element recited. The body of the claim intrinsically sets forth all of the structural limitations, and the preamble merely states the purpose or intended use of the invention, rather than any distinct definition of the claimed structure. *Pitney Bowes, Inc. v. Hewlett-Packard Co.,* 182 F3.d 1298, 51 USPQ2d 1161 (Fed. Cir. 1999); *Rowe v. Dror*, 112 F3.d 473, 42 USPQ2d 1550 (Fed. Cir. 1997). Thus, Horikoshi, et al disclose the invention substantially as claimed. However, the claims are construed as requiring an illumination source independent of said "light source that produces a coherent beam". Horikoshi, et al do not disclose this additional source.

In the same field of endeavor, French discloses a real-time holographic image display. French teaches that the stored holograms can be read out using a separate laser source, and that the laser source can be at a different wavelength, if the read-out angle is adjusted.

It would have been obvious to one of ordinary skill in the art to provide an additional illumination source for read-out of the holograms of Horikoshi, et al, in the interest of providing permitting the hologram to be illuminated with an angle of incidence other than that of the object beam as suggested by Horikoshi, et al. Further, one of ordinary skill would have appreciated that read-out at a different wavelength would have provided the facility to magnify the read-out image, as was well known.

With regard to claims 2 and 3, Horikoshi, et al expressly disclose the updateable holographic recording material as operable to store a succession of image frames (Col. 15, lines 50 - 55). Erasure is discussed in Col. 11 (lines 1- 5). Thus, it is believed that Horikoshi, et al suggest that each of the embodiments is operable in the recited fashion.

With regard to claims 10 and 11, Horikoshi, et al clearly teach use of a spatial light modulator under computer control for intensity modulating the reference beam.

With regard to claim 12, Horikoshi, et al disclose another embodiment (Fig. 1) wherein the object beam optical system (207) is under control of an object beam optical system translation system (209).

Allowable Subject Matter

Claims 6, 8, and 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The following is a statement of reasons for the indication of allowable subject matter:

The prior art, taken alone or in combination, fails to teach or fairly suggest, *in combination with the illumination source oriented with respect to the updateable holographic recording material so as to illuminate at least one hogel recorded in the updateable holographic recording material for viewing by a user*,

the updateable holographic recording material as comprising a flexible film disposed on material supply and material take-up portions, as recited in claim 6, or.

the updateable holographic recording material as further comprising at least one substrate coupled thereto, as recited in claim 8.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Gerritsen, et al (U.S. Patent number 3,542,452) disclose a host of "updateable" holographic recording materials that support ephemeral holograms in a manner suitable for "real-time" recording and playback of holographic images.

Shupe, et al (U.S. Patent number 3,761,154) disclose a rastering scheme for real-time hologram recording and read-out.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Juba whose telephone number is (571) 272-2314. The examiner can normally be reached on Mon.-Fri. 9 - 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Drew Dunn whose number is (571) 272-2312 and who can be reached on Mon.- Thu., 9 – 5.

The centralized fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306 for *all* communications.

JOHN JUBA, JR.
PRIMARY EXAMINER
Art Unit 2872

July 6, 2004